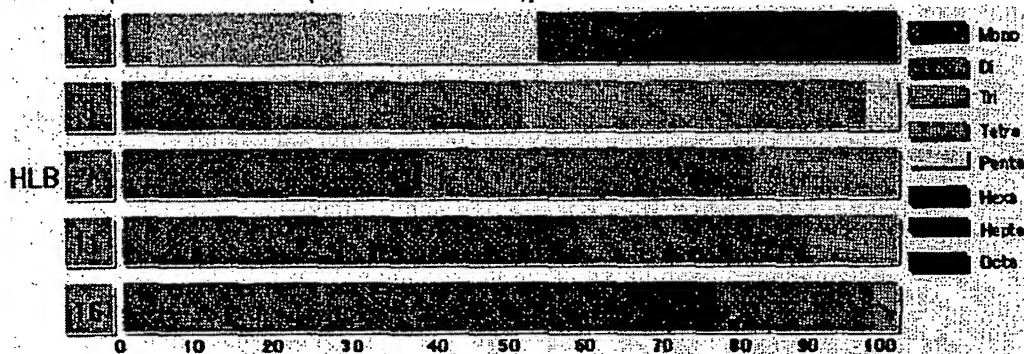


## SURFHOPE® SE PHARMA

SURFHOPE® SE PHARMA are excellent non-ionic emulsifiers marketed by Mitsubishi-Kagaku Foods Corporation. They are highly refined Sucrose Fatty Acid Esters that can be used for many pharmaceutical applications. They are generally very mild to humans and are environmentally friendly. All SURFHOPE® SE PHARMA Sucrose Fatty Acid Esters have US Drug Master Files.

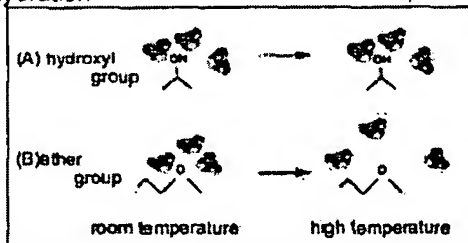
	Type	HLB	Percentage of main fatty acid	Ester composition %		Form
				Mono ester	Di,tri,poly ester	
Sucrose stearate	D-1803	3	Approx.70	Approx.70	Approx.80	Powder
	D-1803F	3	70	20	80	Powder
	D-1805	5	70	30	70	Powder
	D-1807	7	70	40	60	Powder
	D-1809	9	70	50	50	Powder
	D-1811	11	70	55	45	Powder
	D-1811F	11	70	55	45	Powder
	D-1815	15	70	70	30	Powder
	D-1816	16	70	75	25	Powder
Sucrose palmitate	D-1615	15	80	70	30	Powder
	D-1616	16	80	80	20	Powder
Sucrose laurate	D-1216	16	95	80	20	Pellet

[Ester Composition and HLB ( Sucrose Stearate )]



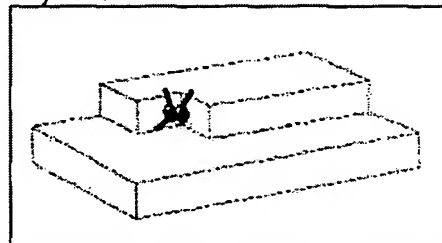
[The functional properties of SURFHOPE SE PHARMA]

### <Hydration>



The affinity of SURFHOPE SE PHARMA for the water phase in an emulsion is derived from the hydroxyl groups (A) of the sucrose part of the molecule. Consequently SURFHOPE SE PHARMA yield emulsions which are exceptionally heat stable because the hydration of hydroxy groups is far stronger than the

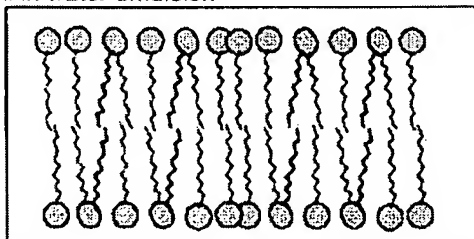
### <Fat crystal control>



Low HLB SURFHOPE SE PHARMA can modify the crystalline structure of solid triglycerides with useful benefits to the physical properties of the product.

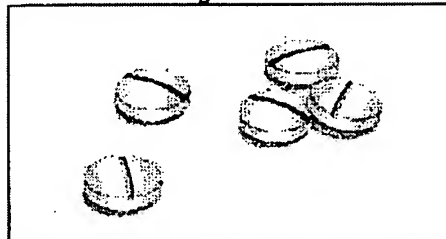
hydration of ether groups(B) in ethoxylated emulsifiers. SURFHOPE SE PHARMA can be used for heat stabilization and produce emulsions that are more heat stable than competing products, especially at higher temperatures.

<Oil in water emulsion>



SURFHOPE SE PHARMA, with medium-high hydrophilic-lipophilic balance(HLB), tend to form liquid crystal structures in aqueous solutions. Because of their compact structure, SURFHOPE SE PHARMA coats the interfaces of emulsions very efficiently.

<Tablet manufacturing>



Low-medium HLB SURFHOPE SE PHARMA are not alkaline and are practically taste-free, a great advantage over magnesium stearate.

[Applications]

SELECTING THE APPROPRIATE SURFHOPE<sup>®</sup> SE PHARMA IN PHARMACEUTICAL APPLICATIONS

	Application	Kinds of Sugar Ester	Suitable Grades
O/W cream	O/W=1/99-50/50	Mixture of Mid to High HLB SE+Low HLB SE	D-1816,D-1815+D-1803 etc.
	O/W=-99/1	High HLB SE (>HLB11)	D-1816,D-1616 etc.
Solubilization	O/W<5/95	High HLB SE	D-1816,D-1616,D-1216 etc.
Microemulsion		Mid to High HLB SE	D-1616,D-1816 etc.
Dispersions of solid particles	particle size<1μm	High HLB SE	D-1816 etc.
	particle size<1μm	High HLB SE+hydrocolloids	D-1816 etc.+Xanthan etc.
Improvement of fat crystallisation		Low HLB saturated SE	D-1803 etc.
Tablet	Lubricant dispersibility	Low to Mid HLB saturated SE	D-1803F stearate SE
		High HLB SE	D-1811F-D-1816 etc.

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